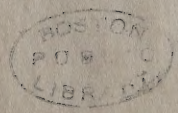


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proposal for
INTERMODAL INTEGRATION PROGRAM



Prepared by the
Boston Redevelopment Authority
for the
Joint Regional Transportation Committee

January 1973

gov. 95-240

INTERMODAL INTEGRATION PROGRAM
PREPARED FOR THE
JOINT REGIONAL TRANSPORTATION COMMITTEE
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January, 1973



INTERMODAL INTEGRATION PROGRAM

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SUMMARY AND PERSPECTIVES

Transportation improvements in the past have generally focused on one mode at a time, often in an isolated fashion. An increasing awareness and resolve to make better use of existing facilities, to improve the environment and to conserve resources has led to programs aimed at "putting it all together". Intermodal integration represents a concern and an attention to all facets of trip-making, with emphasis on better utilization of existing resources and supplementary measures, initially within a relatively modest budget. Such integration improvements would be concerned with a full range of issues involving institutions and agencies, operational conditions and physical plant.

The Boston urban area transportation systems and environment offer many opportunities for intermodal integration. The following proposal outlines a wide range of items which should be investigated for the purpose of indentifying and implementing action oriented improvements. The proposed program directs prime attention on the Boston core area, but must extend into the region to accomplish its objectives. This program is a logical next step in implementing new transportation policies announced by the Governor which stress the total environment and good management. Intermodal integration measures represent a new attitude toward urban transportation problems and the proposed Boston effort offers an opportunity to demonstrate its effectiveness. Federal DOT funds are being sought to support the program. The impending Bicentennial celebration with its influx of visitors adds an air of urgency to this work.

As the intermodal integration involves several planning and operational agencies, the work must be initiated and completed on an interagency basis. Key participants must include the Boston Redevelopment Authority as the City's

planning and renewal wing, the Massachusetts Bay Transportation Authority, Massachusetts Department of Public Works, Massachusetts Port Authority and the Executive Office of Transportation and Construction. The understanding and sponsorship of the Joint Regional Transportation Committee as the repository of the "3C" process in the Boston region is essential. The present proposal deals with only the proposed measures so the concept can be well established. The work force and funding must be subsequently developed.

Examples of the many elements contained within the proposal include informational systems for transit service, pedestrian aids and environments, auto free zones, fringe parking, transit fare structure, traffic surveillance and management, urban goods movements, staggered work hours, minibus service, etc. All are aimed at more efficient travel in a better environment.

INTERMODAL INTEGRATION PROGRAM PROPOSAL

II. INTRODUCTION

Transportation is a derived commodity -- that is, it is purchased in order to obtain other goods and services which are either necessary for existence or offer other benefits to the consumer. For this reason, the worth of transportation facilities should not be judged only in terms of the service they provide, but also in terms of the purpose they serve for the consumer-individual, household, business or industrial establishment or institution. The distribution of transportation -- by mode and by price -- is largely a public service.

In 1970, Governor Francis Sargent declared a moratorium on major highway construction within Route 128, so that the transportation needs of the Boston area could be assessed within the context of a restudy of selected transportation facilities and services within the metropolitan Boston area. Final decisions resulting from this restudy were presented in November 1972. The concern for non-automobile solutions to core area transportation established the framework for this decision in terms of regional perspectives, issues of the environment, economic structures of the core/region and equity among the people of the core/region. The City's transportation goals, in essence, relate to these interrelated factors of environment, economy and equity. Briefly stated, the City's attitudes on these 3 E's are as follows:

- Equity implies the provision of basic transportation services and choice of mode to all segments of society - young and old, rich and poor, and in all geographic areas. It also implies that construction of a transportation facility should not damage one community for the sake of others, without proper restitution.

- Environment involves the full range of issues which exist in the human and natural settings. The negative effects of noise, air pollution, safety hazards and unsightliness of the automobile in dense areas is one of the chief concerns. The conservation of open space, natural resources and human scale are also paramount.
- Economy implies efficient accessibility for persons and goods at the least expenditure of resources, including land. The basic common resource of all people is time, and sluggish transportation consumes this irreplaceable resource.

Discussion of these general purposes also raises serious questions concerning the nature of solutions required by an urban society in transition. Traditionally, planners and others concerned with urban change have attempted to provide solutions to many of these problems through the construction of physical facilities. Following this specification, little emphasis has been placed upon solutions involving new institutional and management mechanisms for resolving the region's traffic and transportation problems. Our analysis suggests that the problem is not only one of facilities, but also one of management and organization as well. Institutional improvements are as important as physical improvements and until effective new institutions have been created, they even deserve a higher priority.

III. FACTORS OF THE PAST AND PRESENT

As a framework for the body of this proposal, the following trends should be considered in transportation planning for the core/region:

- Both population and jobs are decentralizing from the older core cities. The bulk of population and employment historically had been located in the denser, older portions of the region. This situation no longer prevails. Employment and people have begun and will continue to disperse into the area outside of Route 128. This is the growth portion of the

region and can be expected to remain so. However, housing for this suburban population will probably be built at higher densities in the future. The trend of the single-family home is no longer dominant.

- Even so, in contrast to many older core cities, Boston, Brookline and Cambridge retain a vitality unusual in American cities. The central business district of Boston is growing, as are those areas in the core related to the region's thriving educational and medical institutions. These core areas have unique attributes -- landscapes, histories, and institutions unique in American cities -- the Charles River, the waterfront, the State House, Harvard, MIT, Boston, Northeastern and Tufts Universities, and the Boston hospitals. They can be expected to, at a minimum, retain their current population and jobs and more than likely experience some slight growth in jobs. With public assistance, they also may achieve some population growth.
- The economy of Massachusetts is currently facing some severe transitional problems. Not only is unemployment high, but the Boston regional economy is shifting from a manufacturing to service base. This shift implies demands for a labor force with different skills than those needed in a manufacturing economy. Further, a service economy is partially built upon a large number of low-paying jobs. Without constant opportunities for improved training, upward economic mobility is hard to maintain. New educational programs are required for constant retraining of the labor force.
- The physical environment of the Boston region is an irreplaceable resource, requiring protection. The open space, water, and resources, the historic buildings and areas of the Boston region represent the framework for the region's quality of life. Protection of these resources is a necessity if the region is to maintain its unique attributes as a place to live and work.

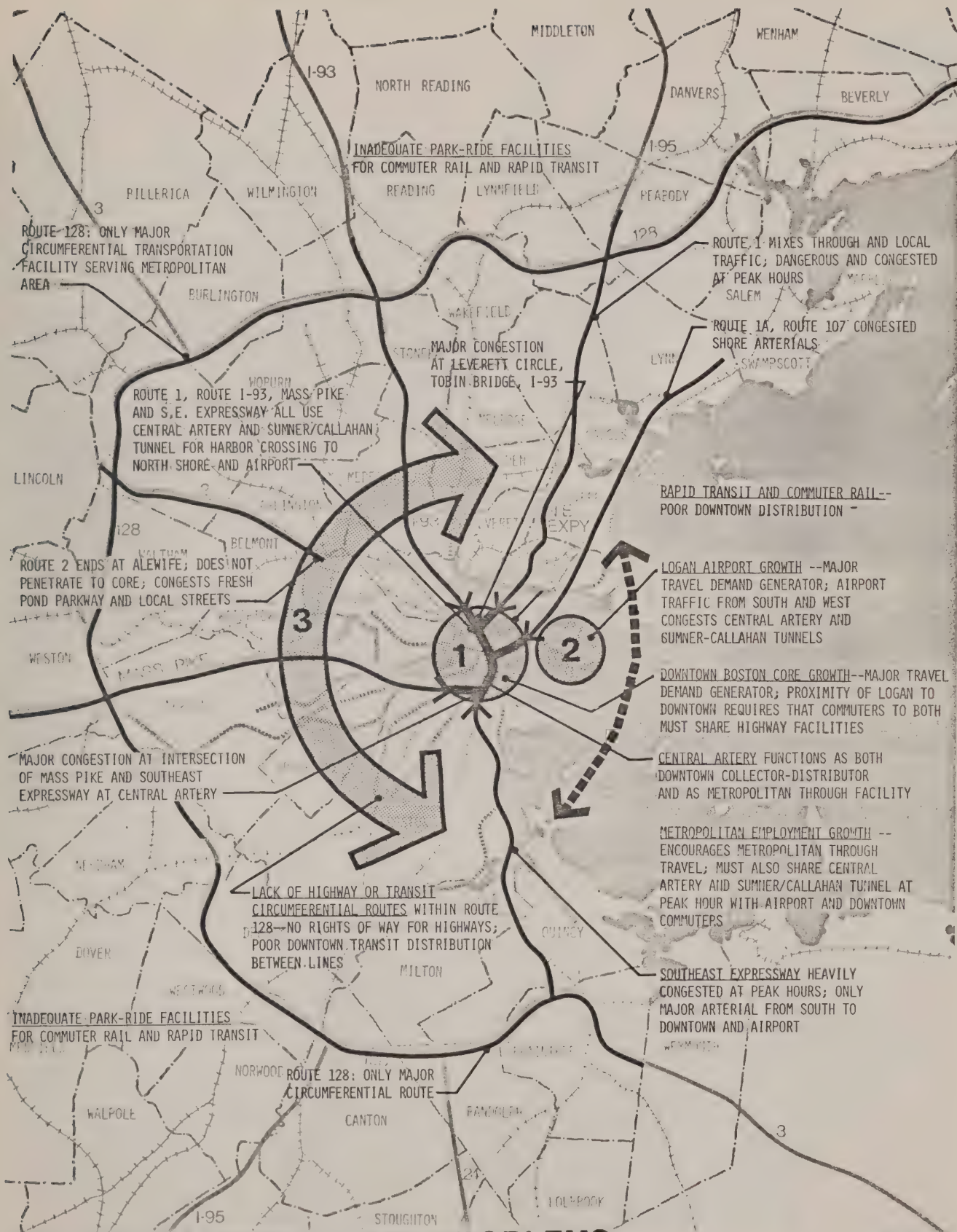
- In spite of economic growth -- which occurred prior to the recent decline -- large numbers of people are still disenfranchised from full participation in the economic opportunities of our society. Growth has not automatically brought about economic advancement for all members of society. There is still a severe income gap in the Boston region. Although the median income in 1969 was \$10,800, many families make only a decent living income when both members of the adult household work. The largest number of low income persons still reside in the core cities. Further, the lack of housing opportunities for the population and for many lower-income groups in suburbia has restricted their residential choice to Boston and the core cities while jobs, simultaneously, have been decentralizing suburban areas.
- The transportation systems technologies which have been developed in the Boston region are of two types -- rubber-tired and rail rapid transit. Since World War II, the form of most metropolitan areas has largely been shaped by the automobile and the truck. Single person trips in a private automobile represent the vast majority of trips made under this system of transportation as jobs, homes, recreation, shopping places and schools tend to grow further apart. Truck movements have become more and more important to the growth of the economy as have service vehicles in a growing services economy. Boston is one of the few cities in the United States that has not become fully dependent upon rubber-tired technology. It has both a rapid transit system, and a commuter railroad system. The existence of these systems helps explain the strength of Boston's core. Within Route 128, large numbers of riders have become accustomed to riding transit. Transit remains a tradition in the Boston area, one of exceptional importance in developing any transportation policy.

The transportation system in the Boston area also has several inefficiencies built into it (see Fig. 1 & 2). First, major portions of the existing transportation system -- in local streets and parking places -- are often a wasted resource. There is no regional traffic management scheme that coordinates the traffic control systems, for example, between one town and another. There is no coordinated parking policy either for the region or for individual towns and communities.

Second, there is no clearly articulated policy in the region which effectively faces the distinctions between the movement of people and goods. Movement of goods is of particular importance to the economy of the region. Further, to the extent that the costs of goods movement are passed on to the consumer, improvements in the system will help achieve the goal of equity. Even those who oppose additional major highway capacity for single-person car trips recognize the need to improve goods movement systems. The current organization of such movement is a burden upon adjacent neighborhoods and a threat to the environment of persons who reside adjacent to truck streets.

Third, rubber-tired automotive technology is an excessive user of scarce energy resources and leads to air pollution. However, in spite of this drawback, many of the future public transportation solutions will depend upon buses or jitneys, a form of rubber-tired technology, as suburbanization of jobs requires such vehicles.

Finally, management of public transportation facilities is as important as management of roads and streets for private vehicles. In fact, the two cannot be separated, although the current administrative function does so. New institutional mechanisms are as important for public as they are for private transportation, and perhaps we can no longer afford the luxury of treating them separately.

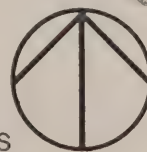


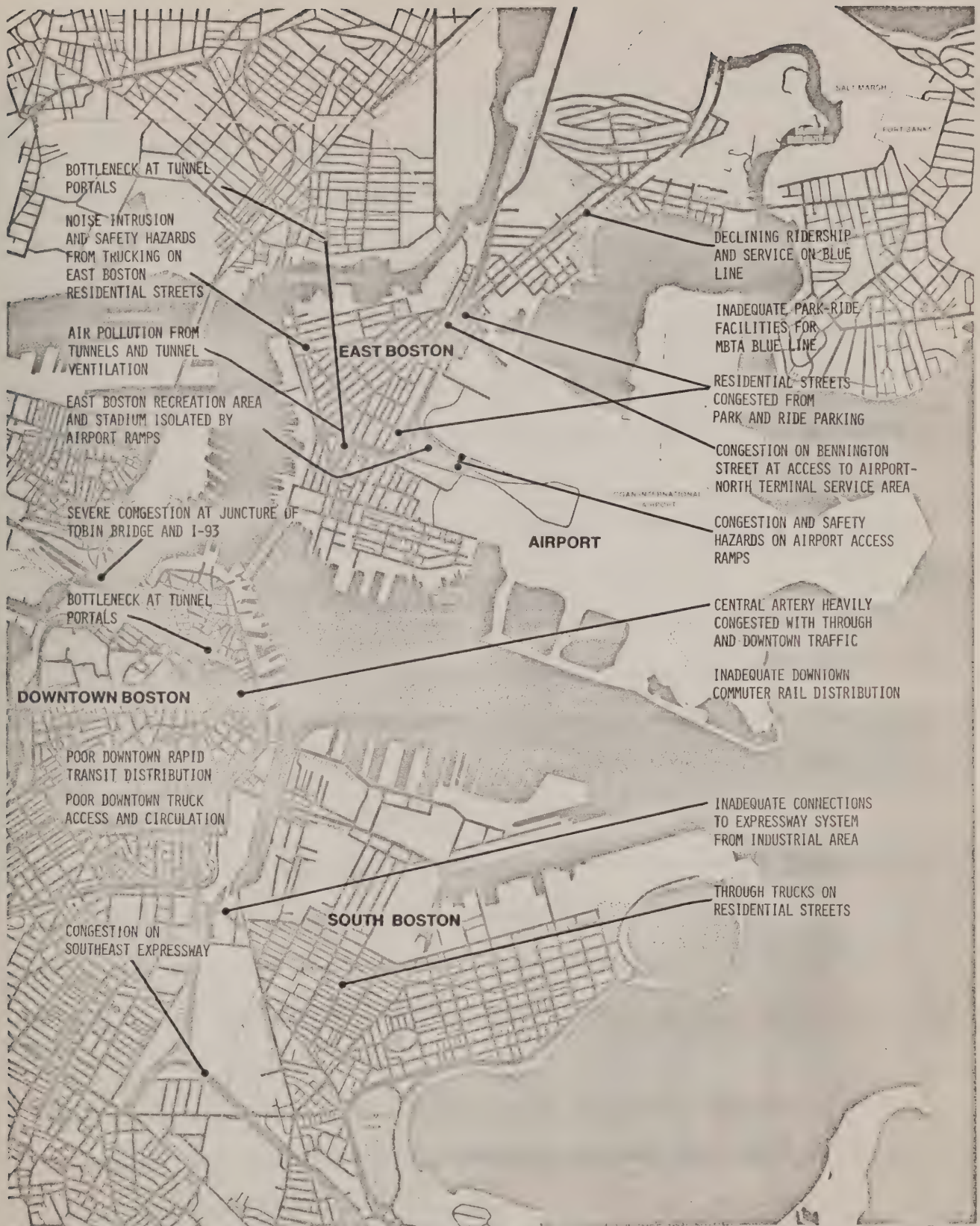
MAJOR TRANSPORTATION PROBLEMS, DOWNTOWN METROPOLITAN REGION

BTPR

FIG. 1

0 1 2 3 4 5 MILES





MAJOR TRANSPORTATION PROBLEMS, DOWNTOWN BOSTON

BTPR

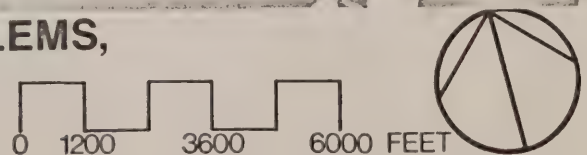


FIG. 2

In consideration of the past trends and present inefficiencies of the transportation system, the following assumptions were made to direct our effort. The assumptions reflect findings developed in the BTPR studies.

- Boston already has a transportation system -- a set of expressways, arterials, public transportation services, etc. The prime purpose of this effort is to identify realistic proposals for improving or augmenting this system so that it will work better now and in the foreseeable future.
- The core of the region is expected to remain strong and vital, and, as such, to remain the focus for the highest volume of travel in the region well into the future. Providing access to the regional core from all parts of the region is important to the continued well being of the entire regional economy.
- Building additional highway capacity to serve access requirements to the regional core at peak hours by private automobile has been declared undesirable. The work travel access requirements of the core should be provided through an expanded public transportation system. Access to the regional core by auto should be discouraged.
- The Boston region needs much improved programs for new public transportation services including special services to handle the special mobility needs of people who do not have easy access to transportation, many of whom are living in the high density, in-city communities.
- The Boston region needs a strong program for improving ways to move goods into, out of, and within the region. Goods movement is largely highway dependent; both special purpose, low capital expenditure construction and operational improvements are required.

- Expressways and line-haul transit facilities should be integrated so that the expressway system may act as a collector/distributor for and extend the market area of transit and commuter rail. This will influence the location of the expressway and transit/commuter rail facilities and implies park and ride facilities in suburban locations and policies and programs to control parking pricing, supply and enforcement in downtown Boston.
- A given transport service approach can be achieved through different combinations and use of present facilities.

IV. THE DEMONSTRATION STUDY AREA

The core area of the Boston SMSA is a unique resource area. It performs five basic economic and social functions which can be described as the face-to-face contact function, the labor pool function, the specialized market function, the cumulative attraction function and the tax support function (See Fig. 3).

The Boston core for operational and analysis reasons area can be broken down into two basic areas: 1) the intensive core area-containing the central business area of Boston and 2) the extensive core (or region extensive) area containing the institutional, industrial, and business areas of Brighton, Cambridge, Somerville, the South End, South Boston and East Boston as well as the supportive residential communities within Route 128 (see Fig. 4). These are the most intensely developed areas of the metropolis and the most likely to be served by mass transit due to the intensity of employment and land use.

KEY

- | | |
|-------------------------|--------------------------|
| 1. RESIDENTIAL | 5. INSTITUTIONAL |
| 2. RETAIL | 6. FINANCE, INSURANCE |
| 3. GOVERNMENTAL | 7. ENTERTAINMENT, RETAIL |
| 4. WHOLESALE INDUSTRIAL | 8. TRANSPORTATION |



BOSTON CORE FUNCTIONAL AREAS

BTPR

FIG. 3



REGIONAL PATTERN OF URBANIZATION

BTPR

FIG. 4

The importance of this area is based upon its contribution, not only to metropolitan Boston, but to the state and the nation as a whole. Among its characteristics are:

- o The state capital
- o Corporate headquarters for John Hancock and Liberty Mutual Life Insurance, ITT Sheraton, Gillette and Polaroid Corporations, New England Telephone and numerous other large organizations
- o An office center for both the metropolitan area and the New England Region
- o A stabilizing retail center
- o A national center for research
- o A national center for health facilities
- o A national center for educational facilities.

THE greatest concentration of these activities lies, of course, in the intensive core of Boston. The core contains the Central Business District with its major department and specialty stores and supporting wholesale districts. Unlike many central business districts across the nation, Downtown Boston remains viable, with an annual volume of over \$400 million. While there has probably been little change in the total amount of space devoted to retail activities in Downtown Boston, some realignment and major investment in revitalization, including improvement by one of the city's landmark department stores, continues to take place. New space continues to be offered in ground floor locations of the many new office structures rising in Downtown, and in the Prudential Center - Back Bay area.

In addition, revitalization of the Boston Waterfront is beginning to take place, providing rehabilitated and new specialty-tourist oriented retail, restaurant, residential and recreational facilities. The retail-specialty functions of Downtown Boston can expect to continue to be viable as office workers, government activities, tourists and close-in permanent residents continue to expand in the Downtown-Waterfront-Back Bay areas.

After a dormant period of slow investment Boston experienced a major transformation in the early 1960's with the construction of a number of new office buildings. From a total of about 17,000,000 square feet of office space in 1960, Boston is expected to nearly double its inventory of space in the Downtown-Waterfront-Back Bay section by 1980.

Boston's strong close-in residential neighborhoods, such as Back Bay and Beacon Hill continue to remain attractive and viable. Additional close-in housing - much of it catering to the middle income/luxury market -- is being constructed in Back Bay, the West End, and along the Waterfront. Urban Renewal is serving as a catalyst for the construction and rehabilitation of housing for low and moderate income housing, which is essential for the heterogeneous population mix which makes urban living attractive for many and distinguishes it from suburban communities.

Boston has another unique resource, uncommon to many major central cities of metropolitan areas in the nation, in that it is the seat of State Government. This provides economic support not only in terms of government employment, but also for the indirect goods and services it requires and the visitor purchases creating a secondary economic benefit to the community.

Major hospitals and medical research facilities are located in the Boston Core or in immediately adjacent areas. Boston is a New England regional and national center for such activities. The Boston area is also endowed with a number of educational institutions -- several of which have facilities in the Boston Core or across the Charles River in Cambridge. While perhaps not contributing their full share of support to the tax base of Boston, these institutions provide other economic support in terms of employment, purchases of goods and services, construction jobs and other activities, as well as the non-measurable educational-cultural benefits they provide the community.

Finally, in spite of a decline of manufacturing jobs in the city and region, the Boston Core still provides a major concentration of this type of job. Over two-thirds of Boston's 68,000 manufacturing jobs are located within two miles of City Hall in the communities of East Boston, Charlestown, South Boston, North Dorchester, Downtown and the South End. Approximately 16,000 manufacturing jobs are located in the Boston Core within 3/4 mile of City Hall, many in the traditional, although declining, apparel industry.

Although no detailed employment studies of Downtown employment were made, the BTPR estimated the following employment change from the 1963 EMRPP base year:

	<u>1963</u>	<u>1970</u>
Retail	36,000	37,000
Service, Finance,		
Ins. & Real Estate	99,000	126,000
Manufacturing &		
Other Retail	111,000	100,000
Total	246,000	263,000

BTPR projections indicate that this employment will continue to increase to an expected 300,000 employees by 1990, and that the highest proportion of these employees, probably in the clerical category, will largely commute by transit.

Although the function of the regional core has changed over time, and the share of the region's jobs in the core has decreased, it remains a vital part of the regional structure. The relationship of any regional transportation proposals to the future of the core, and to the people who now live there, is a central issue.

In defining this future relationship, it is important to note that Boston's core has several nuclei. Not only does it consist of downtown Boston but, as well, contains the core area of Cambridge, Brookline and the institutional fringe -- consisting of those regional, educational and health facilities in Boston, Brookline, Cambridge and Somerville. This subtle net of inter-relationships explains one of the transportation problems of the region. It is now exceptionally difficult to travel from one part of the core area -- say Brookline -- to another -- say Cambridge -- without going through downtown, either by automobile or transit.

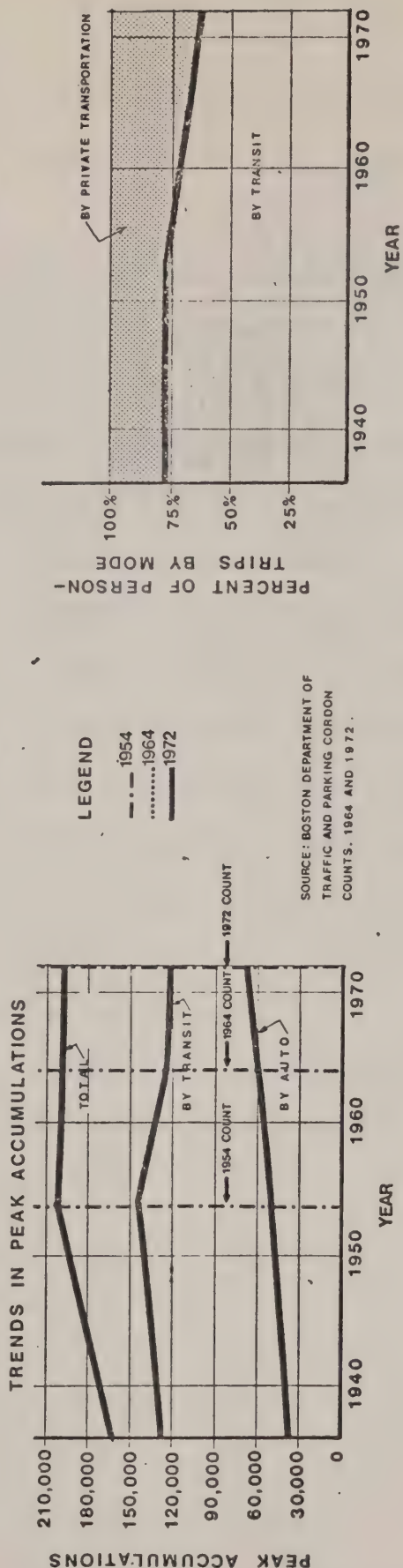
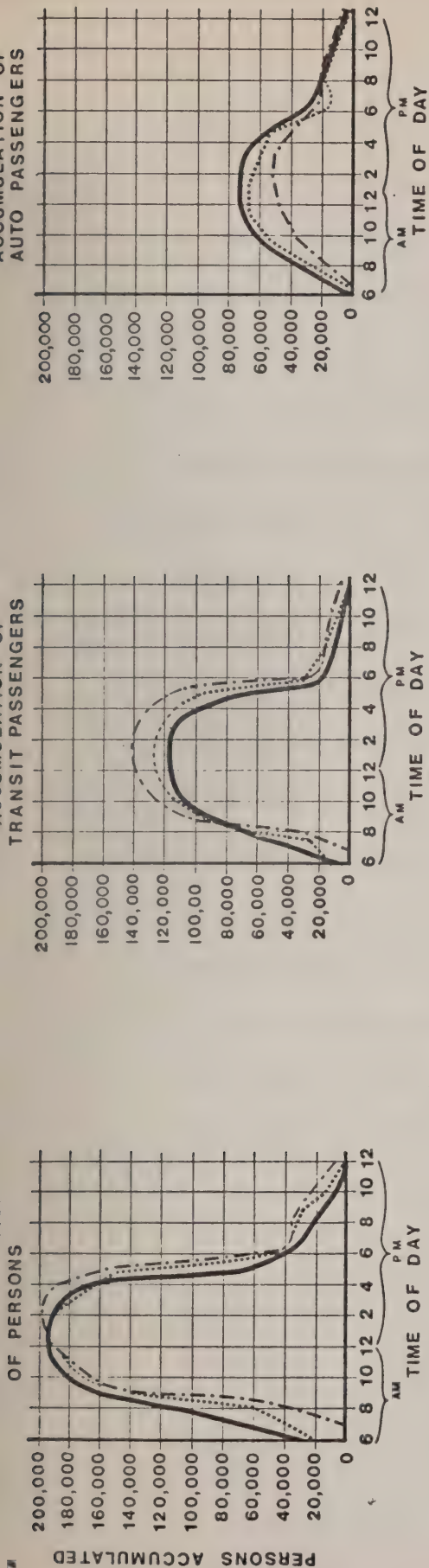
Travel Considerations

Other transportation problems in the core develop from large amounts (almost 50 percent) of through traffic, lack of a coherent parking policy, poor truck access to service office buildings and retail establishments, the overcapacity demands and consequent congestion on the Central Artery, the inadequacy of line-haul public transportation facilities and local arterial street capacity as well as from the absence of circumferential cross-town movements. A comprehensive system of pedestrian movement and access is also absent, further contributing to the low levels of service throughout the transportation system.

The general conditions were further defined as substantiated in the BTPR study. The following travel characteristics, as determined by the BTPR analysis, represent person trip movements to, through and around the demonstration study area (see Fig. 5). The BTPR findings and conclusions are as follows:

- The total number of people entering and leaving Boston Proper by all modes (7 a.m. to 12:00 midnight) increased about 9 percent between 1964 and 1972 -- 1.69 million to 1.85 million. In this period, the number of people using transit declined 40 percent, while the number using automobiles increased 50 percent. The greatest declines in transit riding occurred between 1954 and 1964.
- The number of people entering Boston during the morning peak hour reduced from about 140,000 in 1954 to 115,000 in 1964 and 1972. The number of people leaving Boston in the evening peak hour reduced slightly in the eighteen-year period -- from about 150,000 in 1954 to 145,000 in 1964 and 1972.
- The morning peak-hour inbound transit riding dropped from nearly 100,000 in 1954 to 70,000 in 1964 and 62,000 in 1972, a decline of about 38 percent. Evening peak-hour outbound transit riding reduced from about 105,000 in 1954 to 77,000 in 1964 and 72,000 in 1972.

In 1963, more than half of all CBD person-destinations came from within the city itself -- some 40 percent from suburbs within Route 128 and the remainder from other suburbs. (Nearly two-thirds of all trips between Boston Proper and other parts of the city were made by transit, as compared with 45 percent from the inner suburbs and 26 percent from outer suburbs).



TRENDS IN DOWNTOWN PERSONS ACCUMULATED
BOSTON PROPER

FIG. 5

- Peak-hour automobile travel increased rapidly from about 25,000 in 1954 to 40,000 in 1964. Between 1964 and 1972, peak-hour auto travel appears to have stabilized.
- The growth in total daily entrants, and more specifically off-peak auto travel, probably reflects the continued rise in trips through the regional core. The relative stabilization of peak-hour auto travel reflects the constraints in automobile capacity and the spreading of peak travel.
- The accumulation of people within Boston reflects a somewhat more accurate picture of core-bound travel and CBD intensity. Over the last two decades, the number of people accumulated within Boston has remained constant at about 200,000 persons. However, the transit proportions of this accumulation declined from about 75 percent in 1954 to 67 percent in 1964 and 60 percent in 1972. In this eighteen-year period, the peak number of automobiles accumulated increased from 28,000 to 44,000.
- This increase in auto use reflects the growth in suburban origins of core-bound visitors, the relative improvement of roads as compared with transit, and the expansion of downtown parking.

These trends in trip characteristics provide the context for formulation of alternative transportation strategies for the present and future vitality of the regional core area.

V. Toward A Core/Regional Highway and Transit Policy

Highway and transit planning within the last 3 years has taken place within a policy framework enunciated by Governor Francis W. Sargent. On December 29, 1971, Governor Sargent announced a set of basic decisions which established policy objectives to guide the BTPR's transportation planning efforts. The Governor's statement articulated the following fundamental reasons why new radial expressways designed to accommodate peak-hour travel demands to downtown Boston area were unacceptable as a matter of public policy:

- Inability of already crowded Boston core streets to receive and distribute additional expressway traffic.
- Lack of adequate off-street parking capacity, and inability to provide such capacity in an efficient, orderly fashion.
- Competition with line-haul transit service, both existing and proposed, leading to increased transit operating deficits.
- Inescapable social disruption and environmental degradation as a result of direct displacement, air and noise pollution, visual intrusion and so forth.

In order to provide efficient accessibility to downtown Boston and to maintain the continued growth and vitality of the region's central core, the BTPR was directed to consider innovative improvement programs for the metropolitan transit system. As stated by Governor Sargent:

"Our policy must be to encourage those who work in the Boston core to commute by transit...Implementation of this policy will require an intensive effort to improve our public transportation system. It must take on a bigger share of the job. It will need facilities, services, and funds to do that job. We will look to the Planning Review, working closely with the MBTA, to develop better means of getting around in downtown, and of serving areas that are not adequately served at present."

This policy statement was repeated on November 30, 1972, when Governor Sargent announced his decision not to build anymore new expressways inside Route 128, to vastly expand transit and commutor rail facilities and to propose parking controls in the Core area. Also included in his policy statements was the need for improved management of existing facilities.

The alternatives prepared by the BTPR for consideration by the Governor evolved from an examination of economic interrelationships between communities, alternative regional land use patterns, local mobility characteristics, the potential for decreased dependency on automobiles, transit demand models, and concurrent transit staff studies of line-haul and distribution facilities and demand characteristics. The views of community groups and individual citizens were also a major input. The convergence of policy direction from these efforts led BTPR to believe that a shift already apparent in the region's approach to building a regional transit network should be accelerated.

Underlying goals of this transit improvement strategy can be simply stated:

- Improve equality of mobility and provide the best possible level of service to those now using transit.
- Make the service as attractive as possible so as to increase ridership and reduce auto usage while still providing a high level of total mobility and accessibility to all parts of the region.

The fundamental public policy issue involves the management of and planning for the expansion of the existing transportation resources of the region. An examination of alternative investment programs, primarily in terms of their ability to add to or more fully exploit the potential of the existing system to provide user benefits, has timely and significant implications for regional transportation planning. The focus on present needs

and opportunities leads to a strategy that seeks to assemble a rational system out of component resources that now exist. These resources are identified below, along with an initial strategy to best exploit them.

- Physical resources made up of facilities, structures, equipment and rights-of-way, all used more or less effectively and in various states of repair. Any new or improved system must build incrementally on that which exists.
- Services resources consisting of operating patterns, routes, schedules and fares along with a highly skilled labor pool. New or improved systems must be created through rationalization and coordination of these resources.
- Market resources relating to a transit orientation of many groups and areas within the region. Established patterns of transit orientation, and even dependence, can be found in many parts of the area, often in contrast to the auto-dependent life style daily becoming more prominent. Improved operations and facilities must seek to maintain and build on existing patterns of transit orientation. Implicit is the concept that improvements for those presently using the system are as important as improvements designed to attract new users.

These three resource categories, the existing transit and commuter rail network, the existing labor pool, and the existing transit-oriented metropolitan population, represent an enormous advantage for the Boston region which virtually few cities in America enjoy.

This proposed highway/transit strategy would establish each planning decision in the context of its ability to build effectively upon the existing resources and emphasizes short-term returns to public resources while allowing flexibility for long-range system planning and analysis.

By stressing the short-term considerations, benefits to today's traveler can be increased while enhancing the prospects for achievement of long-range goals. Using this evolutionary strategy, the proposed program would integrate all available transportation resources through the application of proven and innovative management techniques and low capital expenditures, to the transportation framework of institutional, operational and physical structures within the core intensive/region extensive demonstration area.

Specifically, it is proposed to undertake an immediate action-low capital cost program that would accomplish two basic performance objectives: 1) extend and improve existing public transportation availability, and; 2) provide a superior level of public transportation service to, within and around the core.

These performance objectives relate to the interrelated factors of equity, environment and economy as discussed earlier.

In consonance with the Governor's highway and transit decisions and the goals of the city this proposal considers the development of fully integrated movement systems for the collection and distribution of persons and goods in Central Boston (core intensive) and in the surrounding communities (region extensive). Utilizing existing transport resources, the program would promote non-automobile solutions to core area distribution needs. Variable modal mixtures and service applications of existing vehicular and transit services would be initiated through an institutional, operational and physical integration program. An understanding of core demands and responses, as well as real applications of innovative transportation management techniques, for large scale trip movements, in Boston and in other communities with similar problems, would result from this demonstration.

With the initiation of the Bicentennial celebration in the next few years, the demands on downtown will increase dramatically. This places an additional element of urgency on the need for expanded circulation facilities.

VI. THE INTERMODAL INTEGRATION PROGRAM

The proposed effort involves two phases: Phase I is concerned with a low capital cost/management intensive effort to promote short-term benefits. Phase II efforts would consider the long range needs and objectives of a public transportation system. These improvements are generally capital intensive and require considerable time to complete.

A. PHASE I: IMMEDIATE ACTION PROJECT

It is both desirable and feasible to implement a comprehensive intermodal integration program on a core intensive/region extensive scale within the Boston SMSA, extending to and including Route 128 (soon to be designated Interstate 95). The proposed effort would consider all available transportation resources (ie. physical, service, market and institutional) to promote an integrated area-wide transit/automobile program utilizing low capital expenditures and short-term immediate action efforts. The focus on present needs and opportunities would lead to a strategy that assembles a rational and effective system out of component resources that now exist. The existing transit and commuter rail network, the existing labor pool, the existing transit-oriented metropolitan population, the identification and understanding of its transportation needs (Boston Transportation Planning Review) and the commitment toward metropolitan regionalism (Massachusetts Bay Transportation Authority, Metropolitan Area Planning Council and the Joint Regional Transportation Committee) represent an enormous advantage and resource for the Boston region which virtually few cities in America enjoy.

By stressing the short term considerations within the context of long-range goals, benefits to today's traveler can substantially be increased-while enhancing the prospects of achievement of long-range goals.

Specifically, the proposed program would integrate all available transportation resources through the application of proven and innovative management techniques to the transportation framework of institutional, operational and physical structures within the demonstration area.

The elements of the proposed intermodal integration program are as follows:

Institutional Integration:

The following administrative/decision/enforcement mechanisms would be developed, refined or strengthened to effectuate immediate and subsequent improvements. It is proposed to establish the following:

- Overall Systems' Management arrangements pertaining to the jurisdiction and administration of core intensive/region extensive transportation resources. (eg. City of Boston, MDPW, MBTA, MAPC)
- Regional coordination to effectuate an action program to create incentives and/or disincentives for modal use
- Intra-town and city administrative and technical support coordination
- Utilization of existant mechanisms for encouraging and/or discouraging mode selection - (eg. zoning, licensing, pricing)
- Establish and/or coordinate the financial administration of modal use (eg. tolls, taxes, subsidies, licensing, business support)

The following policy issues (and administrative framework, as necessary) would be tested, in order to determine their efficacy and applications.

- Coordinating and/or initiating a new uniform transit and commuter rail fare structure based upon one or more of the following alternatives:
 - zonal system
 - flat fare
 - distance based system
 - special rates by:
socio-economic group

time of day

area of city

day of week

type of trip

time on system

- general passes
 - specific trip passes
 - honor system
 - token system
 - scrip system
 - exact fare system
 - cash system
 - free system (no fare)
 - "free zone" fare system
 - pre-paid system
 - credit card/ticket billing system
- coordinating and/or establishing a uniform core/regional transfer policy that would promote increased transit and commuter rail ridership, through:
 - limited transfer
 - unlimited transfer
 - "free zones"
 - examination and utilization of new revenue resources (eg. business-public revenue sharing, special purpose taxation, income/revenue redistribution)
 - improved transit management procedures
 - staggered work hours and/or work days
 - establish and/or coordinate a uniform core/regional parking policy that would develop incentives/disincentives for auto use based on -

- higher charges in the core with graduated charges by distance from CBD.
- parking restrictions by time of day/ location/useage (eg. CBD on and off/street facilities)
- parking lot space restriction
- open lots, within building, on street
- auto free zones (eg. CBD-retail core)
- improved enforcement
- establish and/or coordinate a core/regional auto use pricing policy that would develop incentives/disincentives for auto use based upon -
 - higher charges in the core coupled with graduated charges by distance from CBD
 - charge tolls by area of city, type of street uses or distance from CBD
 - tax on car use, licenses, commuter tax
 - price incentives (eg. car pooling)
- establish and/or coordinate a uniform core/regional traffic management policy within the demonstration area to encourage/discourage modal selection according to the following:
 - tolls/road pricing
 - restrict auto use by city area, time of day (eg. CBD Financial District access)
 - reverse lanes for peak directional traffic by time of day (eg. Southeast Expressway)
 - reserved lanes for bus use by time of day (eg. Southeast Expressway, Central Artery)

- metered freeway operation (eg. Central Artery)
- signal synchronization (eg. Downtown, Mass. Ave.)
- total traffic control, centralized/surveillance (eg. core)
- one-way street and reversible street operation
- special or no parking zones (eg. CBD area)
- reserved bus ramps (eg. Mass Pike)
- bus stop locations
- parking restrictions
- bus priority system - arterial street system (eg. Mass Ave.)
- reserved lanes for bus and car pools
- reserved streets (for buses)
- water transport
- auto free zones (eg. CBD)
- establish and/or coordinate a uniform core/regional urban goods movement policy that would consider the following:
 - night deliveries
 - package drops
 - single agency pick-up/delivery
 - staggered delivery hours
 - loading/unloading in docks off-street
 - alternate side of street deliveries - time/day
 - consolidated delivery points/terminals

Operational Integration:

The following operational improvements would be undertaken as part of the proposed effort:

- Establish and/or coordinate an area-wide transportation resource information system utilizing standard marketing/advertising techniques.

Necessary facilities and information would include -

- CATV (eg. information terminal, data bank, traffic surveillance)
 - transit routes and stations (eg. maps- internal and external to the station).
 - bus routes and interconnections (eg. street maps)
 - arterial and highway routes and interconnections
 - parking availability and rates (eg. identification of CBD garages and rates)
 - car pool availability
 - telephone information "hot lines" at strategic locations
 - street/area orientation maps at all stations
- Establish and/or coordinate on a core/regional scale the following:
 - Elimination of transit route duplication and inefficiencies
 - new transit routes and route extensions (eg. cross radial linkages)

- extended core/regional taxi service
- jitney service (eg. CBD to Logan Airport)
- charter bus service (eg. commuter)
- cooperative bus service (eg. commuter)
- water transport (eg. Boston waterfront to Logan Airport)
- park and pool (eg. car pooling at Route 128 interchange parking lots)
- demand responsive service (eg. dial-a-ride-bus, jitney service)
- improved transit operating procedures
 - express bus and bus ways and on reserved lanes for line-haul service on freeways (eg. Southeast Expressway)
 - mini bus for downtown circulation
 - improvement to or removal of fare collection equipment
- park and ride lots using existing parking lots (eg. shopping centers at South Shore, Burlington Mall, North Shore).
- Establish and coordinate a uniform core/regional urban goods movement program that would consider the following:
 - night deliveries
 - package drops
 - single agency pick-up/delivery
 - staggered delivery hours
 - loading/unloading in docks off-street

- alternate side of street deliveries -
time/day
- consolidated delivery points

Physical Integration:

Although opportunities exist to expend large capital monies in this item, it is feasible to achieve similar net benefits through the efficient management and utilization of existing transit services, highway facilities and regulatory and development actions. Management techniques and low capital investments would be utilized to establish and/or coordinate the following:

- intermodal transfer facilities (eg. bus shelters at major interchanges)
- joint use of capital equipment
- joint use of personnel (eg. substitute basis)
- standardization of equipment (eg. traffic control, information systems)
- shared spare parts pool (eg. traffic control equipment pooling among several communities)
- shared maintenance facilities
- new park & ride lots (eg. shopping centers)
- bicycle ways (eg. urban paths, Freedom Trail)
- pedestrian environments utilizing existent and proposed facilities (eg. opening MBTA underground passageways currently closed between and within stations)

B. PHASE II: LONG RANGE PROGRAM

Real systems application of the Phase I - Immediate Action proposals will demonstrate the following major parameters for further action:

- the efficacy of proven and innovative management techniques to the movement of people and goods in Boston
- the efficacy of the existing transportation resources to meet the service demand requirements of the demonstration area
- the service demand requirements of the demonstration area, and
- the type of equipment and/or facilities that would be necessary to satisfy that demand

The specific service, facility and marketing techniques that prove durable would be expanded and/or made a permanent component of the transportation network. Feasible durable improvements requiring major capital support would include, but not be limited to, the following:

- Expansion and/or construction of new park and ride facilities at or near major interchanges of Route 128 and/or community centers,
- expansion, extension and/or construction of new transit facilities - (eg. stations, transportation terminals, internal route connections - Green and Orange lines)
- construction of new multi-modal change facilities (eg. South Station, North Station)
- construction of new freight consolidation terminals
- development of and supporting facilities for a multi-modal urban goods movement system, (eg. consolidated terminals, loading/unloading facilities)

- new light rail services-PRT's/ART's/TACV's
- new rapid transit extensions and connections (eg. Cross radial connections-Mass Ave.)
- commuter rail improvements (eg. Penn Central railroad and B & M railroad services)
- development and construction of dual mode vehicular systems
- water transport (eg. ferry service or TACV's-CBD waterfront to Logan Airport for commuter use, or from North or South Shore communities to CBD.

The long range goals of Phase I would be demonstrate and determine the efficacy of proven and innovative management techniques upon the service demand and distribution requirements of a major core intensive/region extensive area. Phase II efforts would bestow permanency to those durable Phase I improvements.

C. SCHEDULING/IMPLEMENTATION PROGRAM

It is proposed to initiate the institutional and operational integration programs concurrently. This may be done due to the extensive regional coordination that already exists within the Boston SMSA. The Executive Office of Transportation and Construction (A Secretariat Office of the Commonwealth of Massachusetts), the Massachusetts Bay Transportation Authority (serving 79 communities covering 2.8 million residents of Eastern Massachusetts, with over 191 bus, streetcar, trolley and rapid transit routes-providing transportation to over 149 million passengers annually), the Joint Regional Transportation Committee (in its formative stage) and the Metropolitan Area Planning Council - all are or will be exercising jurisdictional and administrative coordination of transportation services and facilities within the Boston SMSA. A major restudy of highway, transit and commuter railroad planning, including the demonstration study area, has recently been completed. The Governor's recommendations were announced in November of 1972 and strongly support the need-

for improved public transportation in lieu of extensive new highway construction in Boston. The climate as well as many of the administrative mechanisms required to effectuate a comprehensive intermodal integration program now exist or are merely in need of refinement and strengthening. A low-capital intensive program leading to very rapid and noticeable results, would demonstrate the immediate resource opportunities available for a community, such as Boston, to meet its short-term transportation needs while preparing for its future.

Subsequent sections of this proposal, presented as addendum, provide in illustrative detail, the components of the Phase I: Immediate Action Project; the institutional, operational and physical integration recommendations. As the Phase II: Long-Range Program is in many respects contingent upon the results of the Immediate Action efforts, it would be inappropriate to detail the components under consideration, except to indicate that they are fully compatible with state long term transportations, goals and objectives.

ADDENDUM

PHASE I: IMMEDIATE ACTION PROJECT

IMMEDIATE ACTION PROJECT

INSTITUTIONAL INTEGRATION COMPONENTS

The following policy issues and administrative decision/enforcement mechanisms would be developed to effectuate immediate and subsequent improvements. It is proposed to establish the following:

Overall System Management arrangements pertaining to the jurisdiction and administration of core intensive/region extensive transportation resources:

The proposed effort would institute new, refined or strengthened mechanisms for the implementation of full integration among all transport resources within the demonstration as follows:

- Inter Town-City Administrative, Financial and Technical Support Coordination:

Establish and/or coordinate an effective mechanism between Towns and Cities within the demonstration study area to supervise the operation, financial administration and technical integration of compatible transport resources that are internal and external to each jurisdiction. This effort would be accomplished as follows:

- Utilization of existant mechanisms:

The Boston core/regional area is particularly fortunate to have already in the formative stages the mechanisms that could effectuate the integrating program as proposed.

The Executive Office of Transportation and Construction currently undergoing reorganization and the Joint Regional Transportation Committee are anticipated to have management and advisory capabilities.

- Improved Transit Management Procedures:

Within the framework of the overall transport systems management and integration program, it is proposed to initiate sensitive and responsive transit management procedures.

The Recess Commission of the Massachusetts Legislature and the Executive Office of Transportation and Construction are presenting management recommendations for the revitalization and reorganization of the Massachusetts Bay Transit Authority. It appears that many of these recommendations are in consonance with the needed improvements considered integral with the implementation of this program.

- Coordinating and/or initiating a uniform and equitable fare structure policy on all transport systems within the regional area.

Consideration should be given to utilizing fare structures as a competitive pricing mechanism to encourage increased loading of transport systems during peak and off-peak hours. Currently, the fare structure employed by the MBTA, excluding the routes formerly operated by the Eastern Massachusetts Street Railway Co., require the adult passenger to pay a fare on each vehicle ridden (\$.25 for subway/rapid transit and \$.20 for surface) with free interchange only between underground rapid transit in downtown stations. A ride from downtown Boston to Chestnut Hill on the trolley would require the payment of two fares regardless whether one changes vehicles - one must pay the subway and surface fares. Inequities within the fare structure may result in paying more than twice the fare for a 7 block ride (Boston University to Kenmore Square) than for a 6-7 mile ride (Cleary Square-Hyde Park to Forest Hills). It is, therefore, proposed to consider a revised fare structure based upon one or more of the following alternatives.

- zonal system
 - flat fare on all transit modes
 - distance based system
 - special rates by:
 - socio-economic group - elderly
 - time of day - peak and off-peak hours
 - area of city-CBD-residential-institutional
 - day of week
 - type of trip - commutation/shopping
 - time on system
 - general passes
 - specific trip passes - commutation/shopping
 - honor system
 - token system
 - script system
 - exact fare system
 - cash system
 - free system (no fare on all transit modes)
 - "free zone" fare system within the downtown core area
- Coordinate and/or establish a uniform core/regional transfer policy that would promote increased transit ridership between modes-
- Currently, a free transfer policy exists only within the downtown core area of Boston. Outside of this area, all transfer movements require additional separate fares. The proposed effort would test various transfer alternatives in order to assess the corresponding demands of access and financial/revenue needs.

- examination and utilization of new revenue resources:

Integral to the improvement of the total transportation system, new revenues and revenue sources must be given intensive examination and application. Transit self-sufficiency through effective management and low-capital investment is an overly optimistic expectation of this program. It is anticipated, however, that other means of revenue support will be necessary.

The proposed effort would assess existing revenue sources (Federal, State and local) in an effort to promote greater funding effectiveness with respect to an overall transport resource management program. New revenue sources encompassing both the private and public sectors of the economic community would be examined (eg. public/private cost-revenue sharing, subsidies, fare structures, parking revenues, sin taxes) and utilized in order to more equitably distribute the costs of the public transport system.

- staggered work hours:

This strategy would consist of various arrangements by employers in the CBD core area to reduce the work week to four days and/or stagger the opening hours in order to redistribute and/or reduce concentrated daily employee trips to the CBD and resultant demands upon the distribution system. The four-day week possibilities, include, but are not limited to the following employee off-work schedules:

- Equally rotated Monday and Friday
- One-half Monday and Thursday; 1/2 Tuesday and Friday
- Equally rotated Monday and Saturday
- One-third Monday and Thursday; 1/3 Tuesday and Friday; 1/3 Wednesday and Saturday
- One-half Monday and Thursday; 1/2 Wednesday and Saturday

The action would apply to major employers in the CBD, starting first with governmental agencies (all levels), then spreading to other employers.

- establish and coordinate a uniform core/regional parking and pricing policy that would develop incentives/disincentives for auto use:

Parking plays a key role in the City's transportation system and bears a complex relationship to other land use elements. The major thrust of public and private efforts over the last decade has been an attempt to bring about a balance between parking demand and supply. The net result has been not only encouragement of more traffic and street congestion but the location of garages in unsuitable areas, neglect of mass transit facilities, and other undesirable effects.

Objectives of a Parking Policy

The need to park in downtown Boston is based upon a need to get to a certain activity area, and a presumed need to get to that area by automobile. Parking supply must meet the needs of automobile trips but only up to the point where traffic and parking problems start to interfere with the destination of those trips. If all trips to downtown Boston were made by car, so much land would be given over to streets and parking that there would be no room for Boston itself--and therefore, much less reason for coming here. A high density, space-conserving city must have high density space-conserving access.

In the utilization of space in dense urban development it is interesting to note that while an office worker requires an average of approximately 150 square feet of floor area to perform job functions, an independently accessible parking space requires about 300 square feet or more space. Thus if every office worker were to drive alone to work, parking space requirements would be at least twice the area needed to perform the office activities. This does not count the street area associated with access to the parking area or garage.

Thus, the first objective of a parking policy for Boston must be to sustain desired land uses by providing only sufficient, and not excessive, automobile access and parking.

This will entail encouraging only the number of cars that the downtown street system can carry smoothly and settling priorities for the designated land area. Too little parking in relation to other neighboring land uses may lead to extensive extra circulation in search of a space. However, too much parking will encourage more extensive use of automobiles for downtown trips so that a new disequilibrium of circulation problems is reached.

In no city are the relationships between development, density, street layout, street width and movement simple. In Boston, the irregular layout of the core, combined with its narrow streets, leads to greater problems with movement than in most American cities of similar density. However, it is, in part, these same factors of narrow streets and unique layout, which give Boston much of its attractiveness as a location of various activity centers. We must guard against destroying these factors in an attempt to simply give better access.

We must provide sufficient access including parking, to the whole downtown. We must also provide the right amount of parking, with the right fee structure, to each different district of the downtown. The retail areas need a different kind of parking, and a different amount in relation to square footage of activity, than either the business districts or the entertainment areas. Each functional area must have suitable parking within reasonable reach in order to foster each area's role in the city economy. Where two functional areas tend to overlap, as with retail and office, then it may be necessary to protect a number of spaces for shoppers from commuter encroachment through special rate structures and restricted opening hours. Within each sub-area, garages and lots should only be built and operated where the street system can handle the traffic.

Clearly, any development adjacent to an off-ramp of a major artery can handle more parking than a development served only by arterial streets. Policy should favor the location of parking facilities with direct access to expressways.

In contrast, the streets of the financial districts are simply not wide enough to accommodate large flows of cars and present severe conflicts with pedestrian circulation. Parking facilities should be discouraged where access requires travelling through streets of this type.

The second objective of parking policy is thus to obtain a balance between different modes of access to downtown. This balance relates to only bringing in by highway such traffic as the downtown streets can absorb, and also relates to keeping the transit system supplied with enough customers to provide frequent and convenient service at a competitive price.

In the Boston region, there is a limited amount of peak period excess capacity on existing highways. By contrast, mass transit has significant excess capacity potential although some of this can only be realized with track and signal improvements and better means of bringing suburban commuters to the major transit lines.

It must be concluded that the main employment and retail centers of downtown Boston are served with streets that are not adequate to deliver anything but a relatively small proportion of employees and shoppers by car. While some improvements can and are being made to improve the streets, only large-scale demolition could provide the width needed to carry all potential traffic. Clearly a better network of rail, subway, and bus lines is the best solution to these areas' access requirements.

The downtown in its present form can only absorb a finite supply of cars; to protect the downtown and yet sustain all its many existing activities--retail, office, recreational, and cultural--it is necessary to ensure that efficient travel by less space-consuming modes is encouraged.

The concepts underlying Boston's parking policy are based on the relationship between mode of travel and density of development.

At the suburban end of a downtown trip, the most convenient mode of travel is the private car. Density increases sharply as one moves inwards, until a point is reached where the quickest and most economical means of travel, from both a private and a public standpoint, is mass transit, particularly rail transit. If more capacity is needed to get commuters to downtown, the additional means must be one which not only serves the traveller well but is in the interests of the whole community. There is a threshold point somewhere between the suburbs and the downtown at which it becomes most efficient to transfer from car to mass transit.

These points are generally at the ends of radial mass transit lines where intercept "park and ride" facilities will operate most efficiently. Such park and ride facilities should be supplied at a quantity^{AND} price that enables excess capacity on each radial line to be taken up by commuters. Such a shift to transit commuting will help to ensure that a smaller, more manageable number of cars enter the downtown area. Downtown parking policy is inseparable from suburban park and ride parking policy.

The final objective of this proposed parking policy is to coordinate the efforts of the various State and City agencies. Within Boston City Government several different agencies - Traffic and Parking, Real Property, Public Facilities, the Mayor's Office, the BRA and the Building Department - have a direct role in shaping major parking decisions. At the State level, the DPW,

MBTA, MDC, and Office of Transportation and Construction also play major roles. These agencies often operate at cross purposes and steps must be taken to have their full range of activities, from site selection to rate regulation, operate under consistent and integrated policies.

The following specific actions are proposed. The combined effect of them will be to curb the rate of garage construction, permit new parking only in designated areas and for specific uses, and make regulatory mechanisms consistent with overall parking objectives as well as establishing incentives/disincentives for auto use within the core area. The end result will be a downtown environment more dependent on access provided by a fully integrated transport system which is essential for the workability of this policy.

A. New Development

1. All new public and private parking facilities in a newly created special zoning district (generally Boston proper) shall be a conditional use and shall require prior approval of the BRA (acting as the City's planning body).

B. Existing City Garages

1. As leases on City garages expire or where long term leases can be amended, parking rates and operating conditions will be reviewed and adjusted to meet the objectives of this parking policy. This will include, where suitable, provisions to favor non-commuter parking.

2. Wherever possible, steps should be taken to eliminate unsuitably located or poorly designed garages.

3. Rate structures should be modified to encourage use by adjacent residential communities for overnigh parking.

4. Existing structures should be altered, where appropriate, to improve pedestrian and vehicular circulation and the general environment.

C. Private Parking Regulation

1. A policy of periodically-renewed operating licenses for privately-owned parking facilities, including the requirement for and operating license

covering such subjects as rates, hours of operation and fee collection methods will be explored.

D. Traffic Regulations

1. All on-street parking which is not essential and which interferes unduly with the safe and efficient flow of traffic should be eliminated.

2. Parking meter rates should be adjusted as necessary to a level which is not lower than off-street parking rates in the same area.

E. Enforcement

1. Existing and proposed procedures for the effective enforcement and processsing of parking pricing and usage should be examined and arrangements with necessary agencies (eg. Boston Police Department, Registry of Motor Vehicles) established to aid in their enforcement.

F. Mechanisms

1. Appropriate mechanisms for the implementation of this parking program should be created. Participants would include, but not be limited to the Traffic Commissioner, the Real Property Commissioner, the Police Commissioner, the BRA Director, and the Assistant to the Mayor for Transportation. The committee would cooperate in the formulation and development of the parking policy.

G. Mass Transit Role

1. The proposed parking policy and the well-being of downtown can only be realized through immediate and concurrent improvements to transit which are much more extensive than those already scheduled by the MBTA. This applies to both line-haul service and suburban and downtown collection and distribution. Increases in transit funding will be necessary to accomplish this.

2. The price, comfort, and convenience of transit system improvements must be designed to enable transit commuter trips to compete with auto trips.

3. Low rate park and ride facilities and appropriate transit connections at the periphery of the core in conjunction with the CBD parking rate adjustments to create incentives for their use must be expanded.

4. The integration of all transport resources through proven and innovative management techniques, utilizing a parking use and pricing policy for establishing major incentives/disincentives for modal selection would be a significant aspect of this program.

- It is also proposed to establish and/or coordinate, on a core/regional scale, the following major traffic management policy within the demonstration area to encourage/discourage modal selection according to the following:

- tolls/road pricing:

This strategy, to an extent, is already in existence. To date, there is a fixed charge for a vehicle license. In addition, there are variable fees depending on how much a vehicle is used. These include tolls, gasoline tax, and parking charges. Changes in parking charge were discussed previously.

1. Tolls:

Development of tolling facilities around the core area would strongly affect existing travel patterns. At the present time, fifty percent of auto vehicles entering and exiting the Boston core are making through trips. There would be considerable relief to the core because of diversion by core bound auto commuters to transit, and diversion by through auto drivers who would attempt to find circumferential paths in the inner city or inner suburbs, thus avoiding the tolls. New revenues could be utilized to support alternative urban transport modes.

2. Sophisticated on-board hardware

A meter attached to the vehicle would register either time or distance travelled in different city areas, e.g. in the core, inner city and inner suburb. A price would be charged to the user (or owner) depending upon use and area in which the vehicle was driven. The data from the meter can be gathered either as punched tape or by electric interface with hardware by means of vehicle detector loops in the road bed. This second system appears to be implementable only after 1977.

3. Differential Licences

Annual or daily licenses can be bought by drivers in order to drive in congested or high pollution areas. Although they are simpler, they do not have the precision of on vehicle meters. The license system could be developed quickly on a subregional basis, and would be used together with mass transit improvements, vehicle free zones, and parking pricing and supply. The system has potential in all areas of the region.

- restrict auto use by city area "auto free zones":

The concept of vehicle free zone includes either complete or partial exclusion of vehicles from designated areas of the Boston metropolitan area. Use of this traffic restraint requires rearrangement of vehicular flow through the area. Dependent upon degree of enforcement, commercial vehicles, taxis, and public transport could be allowed to enter the zone. Provision would be made for emergency vehicle access into the zone. The City's objectives of a vehicle free zone, through reducing and/or diverting traffic flow through defined traffic problem areas, includes the following:

1. Improvement of the environment for people living, working and shopping in the area.

2. Improvement of public transport operations.

Banning vehicles completely in certain parts of the city has been tried in several locales, including Tokyo, New York, and Gothenburg Sweden. An alternative to the complete exclusion of vehicles from an area is the use of a partial vehicle free zone. One variation of a partial vehicle free zone would allow vehicles access into the zone, but would not allow traffic to flow through the zone. The vehicle free zone control would be mainly applicable to the downtown business area, and in regional retail areas.

- Transport service improvements policy:

It is proposed to establish a policy to initiate exclusive dedicated rights-of-way on specific core expressways and major arterial streets in order to facilitate public transit service so as to encourage the use of such service. Specifically, the proposed effort would initiate the following:

- Bus ways on exclusive right-of-ways located on existing roads. This is particularly oriented to the suburban commuter to downtown. Substantial savings in cost and travel time can be the result of these actions, particularly in congested areas. The capacity of existing lanes would be well utilized, and there can be a significant diversion of auto users resulting. This concept can be expanded for use by high occupancy vehicles.
- Bus and trolley priority systems. By triggering the green phase on traffic signals, bus passengers save some time. The advantage in time would be slight however.
- Organized car pools, bus pools or subscription bus services. All of these actions have the objective of producing widespread group riding so as to reduce the number of vehicles and vehicle miles of travel. The actions have substantial potential, but only if extensively implemented.

Alternative strategies, such as central area parking restraint, are needed to ensure widespread acceptance. There are a number of disadvantages including the fact that start and completion times for work become less flexible, thus impacting the success of the staggered work hour strategies. The area of implementation is primarily for the work commuters to the core.

- Reversible and reserved bus ways: limited testing of this concept has occurred on the Southeast Expressway. It is proposed to construct permanent reversible bus lanes on a reserved right-of-way on the major highways (radial and circumferential) within the demonstration area. Such highways would include, but not be limited to, the Southeast Expressway, Mass Pike, I-93, Route 1, Route 2, Route 9, Route 16, and Route 128.
- Core/Regional Traffic Surveillance and Control System:

A surveillance and control system would be directed toward regulating traffic flow on the major core expressways and arterial streets. A surveillance and control system would optimize traffic flow by utilizing traffic control devices and detectors to detect demand and problem areas, analyzing this data by the use of digital computers, and regulating traffic flow on and to the expressway through the use of advisory signs and ramp flow metering devices.

In addition to aiding normal traffic flow, the surveillance and control system would provide a more flexible control system during unusual demand periods such as holidays, special sports events, conventions (eg. during the Bicentennial celebration). A surveillance and control system would also permit a better response to accidents, stalled vehicles, and other emergency problems.

Major components of a surveillance and control system include the following:

- Television cameras to survey freeway operation, (eg. Central Artery)

- Motorist aid telephones for driver-communication with control center
- Traffic sensing devices in expressway lanes and in ramps for detecting traffic demand, level of usage, and characteristic traffic flow
- A digital/analog computer to analyze input of traffic sensors and to make decisions regarding the level of traffic operation and distribution of traffic on expressway system
- Ramp control devices to regulate the flow of traffic
- Informational signs to give motorist information concerning freeway operation

Surveillance and control experience on expressways is relatively new. Recent projects include the Lodge Freeway in Detroit, the Eisenhower and Dan Ryan Expressways in Chicago, and the Gulf Freeway in Houston. Initial results of these surveillance and control system projects are as follows:

Eisenhower Expressway, Chicago:

- Peak period of congestion reduced, e. g. from 75 to 30 minutes at one location.
- Traffic volumes maintained.
- Peak period speed increased an average of 25%.
- Accidents down by about 17% in peak period.
- Arterial traffic conditions maintained.

Gulf Freeway, Houston:

- Traffic volumes up an average of about 10%.
- Peak period speed increased about 30%.
- Peak period accidents reduced by 48%.
- No deterioration in street operations.

John C. Lodge Freeway, Detroit:

- Freeway volumes decreased slightly.
- Arterial street volumes increased but travel times decreased due to new signal timing.
- Freeway peak period travel time reduced from about 29 to 17 minutes.

Dan Ryan Expressway, Chicago:

- Travel time reduced from 20 to 10 minutes.
- Parallel street travel time decreased.

The extent of a surveillance and control program, encompassing the Boston area expressway network within Route 128, is essentially a modification of that originally planned under the Boston Surveillance and Control Project for what was then termed the "ultimate expressway system." With the recent decision not to build any new major expressways, a surveillance and control program could be reasonably planned for existing expressway facilities, including I-93, Route 2, Massachusetts Turnpike Extension, Southeast Expressway, and the Central Artery.

- Operational Improvements:

Arterial and local street operation in Boston is characterized by high traffic volumes, frequent vehicular - pedestrian interface conflicts, and interruptions caused by parking maneuvers and truck operations. All of these factors result in both side and internal friction forces that cause lower vehicle speeds, increased riding times, and increased stop and start actions.

Traffic operational improvements to alleviate the above deficiencies and smooth the flow of traffic include alignment changes, widening intersections, parking restrictions, signal progression, loading regulations, and circulation changes. The basic contribution of traffic operational improvements is an increase in speed and a reduction of safety hazards. Many of these improvements are eligible for or are already being undertaken as part of the TOPICS program.

- establish and coordinate a uniform core/regional urban goods movement policy that would consider the following:
 - night deliveries
 - package drops
 - single agency pick-up/delivery
 - staggered delivery hours
 - loading/unloading in docks off-street
 - alternate side of street deliveries - time/day
 - consolidated delivery points/terminals

This item is discussed in substantive detail within the following section - Operational Integration.

B. OPERATIONAL INTEGRATION COMPONENTS

The following operational improvements would be undertaken as part of the proposed effort:

- Establish and/or coordinate an area-wide transportation resource information system utilizing standard marketing techniques as follows:
 - CATV - multiple use of CATV facilities for information collection-distribution data terminal, data bank and transmission and cable equipment use in traffic and transit surveillance.
 - The routes of all public transport companies within the MBTA district should be numbered consistently and clearly throughout, so as to avoid the unnecessary confusion. It would appear desirable that the renumbering should be associated with the rationalization and simplification of the actual pattern of routes. It is, therefore, proposed that the new numbering should be worked out as soon as possible and applied to the existing route structure.

- The 24-hour clock should be adopted for all transit schedules and timetables in Boston, hopefully giving the lead to the nation's transportation systems generally. At present there are several different ways of showing bus times, ranging from the costly use of a second color to the use of light and heavy typefaces; all are liable to be misread.
- Publishers of guidebooks of Boston and organizations advertising buildings of interest open to the public, museums, theaters, stores, etc., would be required to include in their guides, booklets, leaflets and posters details of the bus routes serving the whole area in their particular locality. At the moment this is seldom done, and it can be pointed out to the promoters that to include such information is entirely in their own interests. Many visitors, attracted by a leaflet, may be deterred from going to the attraction advertised because a further enquiry on how to get there has to be made before they can start. The details supplied must be kept strictly up-to-date and the organizations cooperating must be given early warning of possible changes in bus routes and/on time tables.
- A separate leaflet would be prepared, designed specifically for the visitor and containing a map with routes of the central area of Boston. The places of interest and tourist attractions should be highlighted. This will be particularly important due to the Bicentennial celebration in two years. The need for the separate visitor's leaflet and map is dictated by the fact that the all-services map, although an almost essential piece of equipment, is likely to provide more information than many sightseeing visitors are likely to require.

In addition to the map, the tourist leaflet should contain short descriptions of the fare system, lost and found arrangements, tours, the information service, etc. It should also contain short paragraphs on the main tourist attractions, giving specific travel details of those which are off the map, such as Concord and Lexington.

This leaflet should be available on a help-yourself basis at the airports, at all travel terminals and on the counters of travel agents, hotels, motels, etc.

The leaflet should have the widest possible circulation and could well carry a few advertisements that would help to defray the cost.

- Timetable leaflets for all bus companies should be initiated or standardized as far as possible, in both format and content, so as to help in presenting bus transit as an entity.

The leaflet should contain a route map, as large as possible, the fullest list of places served, and an explanation of how arrival and departure times can be roughly calculated. There should be details of fares and, if space permits, details of points of interest. Commercial advertisements could appear on those formal documents to help defray printing and distribution costs.

- New bus top posts and markers, carrying the transit logo, route numbers and service information panels should be installed starting with the downtown area.

The display technique selected by the authors of Report INT-MDT-10 and illustrated in that report appears satisfactory and could be adopted as it stands.

- Uniform standards should be established for the format and content of service information displays on bus stops and at all secondary information sources (eg. hotels, activity centers, etc.).

The basic information required is a list of the routes served by the stop in question, supplemented by details of those routes. This consists of a list of the more important places served by that route and either a full timetable (if the frequency of the service is less than, say, 3 buses an hour) or some indication of the frequency.

The same document should appear throughout the route but in one direction and appearing at stops on the opposite side of the road.

Full timetables should be posted whenever possible and essentially at terminal points where, if they cannot be posted on shelters, special arrangements will have to be made.

- Lettered bus stop schemes should be introduced at important traffic objectives which have several bus stop positions.

This technique is a method for showing both the route that a passenger requires and the position of the related stop where he can find the bus that he needs. They are applicable only to these situations where there is some complexity of routes, at terminals and other points where several routes converge.

As has already been mentioned in connection with route numbering it would not be difficult to implement this particular proposal under the present system as figures are used to denote routes. It would be an important aid to ridership.

Within a bus station on modal change facility it may be necessary to identify at a glance the locations from which particular routes depart. For this purpose, a very similar arrangement to that described above can be made.

When a number of feeder or distribution bus routes serve a station, the lettered bus stop scheme may well be essential. In this case the display should be close to the station exits.

- Bus shelters should be designed and progressively installed where desirable, starting with important downtown locations. The MBTA is currently installing such shelters in isolated locations, but more would be desirable. Shelters where they may wait with some protection from the weather and where they may find details of the bus services would be appropriate.

Provision must be made in the design not only for the display of information on a panel inside and outside, but for the bus stop sign and route details to be integrated.

The location of shelters should be related to passengers' needs. Shelters are required wherever there is a concentration of waiting passengers in exposed positions, or where there is transfer between bus routes.

- Service information display panels would be erected at sites where shelters are desirable but not practicable because of other conflicting interests. The type of panel should be simple and it should be free-standing. It should carry the full map of the bus system, together with timetables and other route data, an indication of the position of stops and any publicity for which space can be found.
- Counter information service offices for bus transit information would be established at a few strategic sites.

It is a mistake, to dehumanize a system into a coldly impersonal machine. It is possible to devise computer programs that will provide route information and up-to-the-minute alterations. It would be

feasible to install such a device on some push-button or even voice system to run in parallel with the information desk. This type of information service was aptly demonstrated as part of the City/Signs/Lights Demonstration Project in 1971 in Boston.

What is required is an over-the-counter service where the rider will explain his problem, be given an honest answer (he may be recommended to take a cab if this is the only sensible solution) but also will leave with a map on which the point he wishes to reach is marked and with other useful information. The tourist who asks, for example, how to get to the State House will be given other information about it with the travel directions. He should also leave with details and recommendations as to tours and special tickets.

There are three or four locations where such offices should be considered. The MBTA already has scattered information centers (eg. Park Street Station). People seeking route information, currently, may have a considerable wait for information which ought to be immediately available to them. It is axiomatic that any changes in routing or alterations to schedules must be instantly fed into this office.

A typical site for such a bus tranist information office should be at the new South Station complex. It is not yet clear, except in general terms, what facilities are to be provided in that complex but as it is to be the point at which many visitors to Boston will arrive, an information counter where transit enquiries can be answered and where special tickets, guide books, maps, etc., can be purchased seems essential.

Further possible locations for transit information offices would include but not be limited to Kenmore Square, Harvard-Central Squares, Wellington Circle, Codman Square, Fields Corner, Columbia Square, Mattapan Square, Roslindale Square, Forest Hills Square, Union Square, Cleveland Circle, Coolidge Corner, Cleary Square and at major shopping centers in the Route 128 vicinity (eg. North and South Shore Shopping Centers, Burlington Mall and so on) and at Logan Airport.

Traveler information becomes critically important with the initiation of the Bicentennial activities in Boston in 1975. With "The City as the Exhibit" as the theme of the celebration, it is especially relevant that day and longer visitors become familiar with transit opportunities within the region.

- An improved and coordinated transit telephone information service would be initiated .

This is an equally important service to the public and there is some community relations merit in making it a 24-hour service. It is one of the advantages of a telephone service that its location is quite unimportant allowing easy access to everyone. What is important is that the information provided should be entirely accurate and given patiently. If the lines are busy there should be a stacking device so that calls are held until a clerk is available, and a recorded message should explain this to the caller perhaps giving other useful information while he is waiting.

Community relations should be a deliberate, planned and sustained effort to establish and maintain mutual understanding.

- Guidebooks, leaflets, bus schedules, posters of transit routes and facilities should also contain the location and rates of major parking facilities in and around the Boston core. Connections to transit links from the parking lots - park and ride/kiss and ride should be clearly identified and incorporated into the system-wide transport operations. Car pooling at these parking facilities should be identified and promoted through comprehensive information distribution.
- Establish and/or coordinate on a core/regional scale the following:
 - Elimination of transit route duplication and inefficiencies
 - New bus transit routes and route extensions:

Establish new cross radial linkages connecting major community business, residential, and educational/institutional centers such as Tufts, Harvard, MIT, Northeastern and U. of Massachusetts institutional crescent.
- Taxi and jitney service:

This strategy concerns the expansion of current taxi and limousine service, particularly to the airport and the major park and ride automobile intercept facilities. These systems are alternatives to public and private transport and normally return a profit to the operators.

Jitneys are fixed route, but have numerous small vehicles, between bus and cab size. They operate on a random schedule, and are sometimes radio dispatched. The variable routing characteristics include:

 - Fixed Corridor: Vehicle moves along a defined corridor, providing point-to-point service in response to calls.
 - Many-to-One: One terminus of all trips to a common point, such as a rail station, shopping center, or other facility.
 - Many-to-Few: By design or by happenstance, travel is somewhat ordered at one end of most trips. In between many-to-one and many-to-many.

All of these require smaller than full-size buses for practical operation, with size decreasing as randomness increases. Operation may be direct-response radio dispatched, or advance notice scheduling, or subscription, or mixed combinations.

- Charter and Cooperative bus service:

Organize charter and/or cooperative bus service from residential suburban communities at or adjacent to Route 128 and 495 so as to increase multiple ridership and reduce the number of autos entering and vehicle miles traveled within Route 128. Pick up and delivery service could be scheduled to correspond to transit schedules or direct line-haul operation. Pick-up and delivery locations would be coordinated with Route 128 fringe parking facilities and at park and ride lots at scattered shopping centers throughout the region.

- Improved transit operating procedures including but not limited to the following, short-term improvements:

In short term, 1) on-street parking enforcement at or near bus stops should occur; 2) priority should be given to surface transit vehicles through creation of special lanes on streets and highways; 3) bus priority traffic signal timing and other arterial improvements and management techniques. 4) Bus system reorganization to be more responsive to travel desires. 5) Express routes should be increased where appropriate using special lanes and charging a premium fare. 6) Areas not well covered by transit should be served on an experimental basis; 7) bus lines should be linked together to reduce the number of transfers; local institutions and housing concentrations should be served and schedules should be adjusted to match service with actual demand. 8) Specialized services should be offered such as to shopping centers. 9) Bus stops should be

signed with information such as route and schedule. 10) Crosstown or circumferential routes should be instituted, tying together the academic and hospital institutions. 11) Schedules should be coordinated to reduce waiting time for transfers. 12) Transfers should be reinstituted. 13) Railroad service should be upgraded and coordinated with Bus operations; 14) The Watertown streetcar should be restored and improvements made in vehicular flow along its route, thus restoring a one-seat ride to Downtown and Back Bay from this corridor. 15) The Huntington Avenue transit median should be extended to the intersection of South Huntington Avenue and improvements made along Center Street in Jamaica Plain to aid traffic flow. 16) The South Shore line should be extended to the intersection of Routes 3 and 128 and a regional modal change facility built to alleviate the Southeast Expressway. This facility would include east highway access, ample parking and bus feeders. 17) The parallel tracks of the Ashmont and South Shore branches should be reconstructed to allow express and local operation on both branches and new stations built at Neponset, Savin Hill and Columbia. 18) Pedestrian tunnels in a "free zone" downtown district should be built connecting the 4 downtown transit stations to reduce train loading and travel times by transfers and provide another retail level with connections to stores. 19) This pedestrian system would be extended as part of a weather free system and connected to any second level systems which may develop. 20) In addition, coordinated a fare structure should be initiated based upon one or more of the following alternatives: zonal system; flatfare; distance and/or time based system; special rates for socio-economic group, time of day, area of city, day of week, type of trip; general passes, specific trip passes; honor system; token system; script system; exact fare system; cash system; credit card/billing system; free system (no fare) and a "free zone" fare system.

These short term improvements should improve existing commutation and begin to attract new riders to the system.

- Water transport development:

It is obvious when regarding a map of Boston and its attractions that many of them are a short distance from a waterbody and/or the water edge of the City.

Therefore, it is quite logical to propose the implementation of a system of water taxis, air cushion vehicles or small ferries that can travel the inner harbors on a reasonable frequency and deposit passengers at carefully prepared landing places. This has a number of advantages.

For one it maximizes the fun of transportation rather than the overcrowdedness and heat that usually occurs in the summer on buses and trolleys.

Thus for the visitor from out-of-town and for the resident traveling there can be fun and a pleasant experience on the waters of Boston's harbor, this in itself should be a major selling point for promoting travel in the "City as an Exhibit".

In addition it serves a major purpose if it can operate at appropriate frequency and carrying capacities by taking away from city streets many hundreds and perhaps thousands of daily trips. This has an obvious advantage in that it frees up the city streets for other purposes and, of course, other visitors.

- Establish and coordinate a uniform core/regional urban goods movement program that would consider the following:

- night delivery operation:

Productivity and delivery rates (a function of productivity) is affected by congestion, traffic regulations and restricted receiving hours and locations. Night deliveries/receiving would be a signifi-

cant productivity boost to the carrier. Under present union contracts there is generally no overtime penalty for night starting times. In addition carriers would run their units maximum hours per day, as do the airlines. The advantages to carriers, business (goods on the shelf prior to business hours) and traffic flow are many. Staggering delivery hours in conjunction with staggered delivery points (specific sections of streets during certain hours and days of the week) would also contribute to improved operational efficiency.

- package drops:

Consolidated handling of small multiple cartoned shipments (eg. the United Parcel Service already utilizes such a distribution system) at delivery points with internal distribution undertaken by receivers.

- single agency pick-up/delivery:

Operating in consonance with package drops, an auxiliary terminal should be established or existing facilities should be used to initiate a system where all, or a portion of, deliveries to tenants in the central business district would be made to this terminal. The material would be consolidated by building and tenant and would be delivered to the building/tenant as full loads by single agencies. The outside/fringe consolidation terminal would increase internal handling capacity and would greatly expand the service area of the distribution system. Instead of 600 trucks per day carrying 100 pounds each, it would be feasible to use 10 trucks per day carrying 6,000 pounds. The savings in stop time and congestion are obvious.

- consolidated delivery points/terminals:

The proposed single agency pick-up/delivery service, internal to the City's goods distribution system would operate from existing as

well as converted terminal facilities arranged as depots throughout the region - each depot to serve a specific designated service or cluster area. All freight movement within the area and all freight movement to the area would be intercepted and sent to that depot and then sorted by block/building/tenant for delivery. All freight leaving the cluster would also be consolidated in that depot and forwarded to the proper cluster. A small fleet, functioning on a single-agency pick-up/delivery and/or package drop operation would perform the distribution service. A few relatively large trucks would perform the intercluster service.

- loading/unloading in docks off-street:

Provision should be made in present structures and in future design for adequate loading/unloading facilities within buildings or in protected bays adjacent to the building. These alterations should be initiated in coordination with the following:

- Traffic management/urban goods movement:

The following programs would be initiated in order to keep traffic fluid and to allow for the necessary goods distribution services in the CBD-

- alternate side of the street delivery program
- reserve curb-lane use for trucks in specific loading/unloading areas
- enforcement of curb lane management
- coordinate with traffic operations programs - signal system timing and coordination, bus loading/unloading, pedestrian safety, parking policies and transit development.

- Establish and/or coordinate urban goods movement connections utilizing existing systems not currently utilized for that purpose:

This effort would promote goods distribution through the use of present equipment and facilities not generally considered for such purposes. The MBTA core transit system provides access to many areas of the core. As service on this system is substantially reduced during late evening and early morning hours minor modifications could be made to present hardware to permit the transport and distribution of goods. Underground corridors, already in existence, could extend the distribution service, as well as allow for direct connections to the surface buildings through basement/below grade receiving terminals. It is also proposed that these corridors could provide other services, including, but not limited to, pedestrian and retail service uses. These existing corridors and additional uses are discussed in detail within the following section - Physical Integration: Pedestrian Environment.

C. PHYSICAL INTEGRATION COMPONENTS

Opportunities exist to expend large capital monies in this item, yet it is feasible to achieve similar net benefits through the efficient management and utilization of existing transport resources: transit services, highway facilities and regulatory and development actions. Management techniques and low capital investments would be utilized to establish and coordinate the following:

- intermodal transfer facilities:

Utilizing existing transport facilities, it is proposed to expand their service applications to encourage multi-modal use. Specifically, the proposed effort would promote the following:

- increased use of interchange R-O-W:

The proposed effort would include 1) intercept park and ride facilities, 2) bus routes and transit connections from the park and ride lots to major bus and transit terminals, 3) bus shelters, 4) information kiosks detailing transport options, points of interest, car pooling availability etc.

- establishing and/or delineating specific pedestrian/transit/bus connections:

The proposed effort would establish these connections at major transit/bus stations and/or stops through the provision of bus shelters and appropriate information distribution. Possible locations would include, but not limited to: Copley Square, Harvard Square, Coolidge Corner, Cleveland Circle, Mattapan Square, Columbia Square, Fields Corner, Forest Hills Square, Codman Square and Newton Corner.

- promote joint utilization of regional parking facilities:

Initiate joint use of parking facilities at major shopping centers and recreation facilities (eg., Wonderland Dog Track, Suffolk Downs Racetrack) for park and ride and secondary bus distribution terminals.

- joint utilization of major core parking facilities:

Initiate joint use of parking facilities within the core with minibus operations to provide increased core distribution. The Commons Garage is presently operating in this manner.

- joint utilization of MBTA underground passageways:

(discussed in detail in a subsequent section.)

- joint use of capital equipment and facilities:

Establish and/or coordinate increased efficiencies of the existing facilities and capital equipment through the initiation and application of joint use arrangements of these facilities and equipment by their owners and/or operators. Suitable facilities would include, but not limited to, the new South Station development, Newton Corner, Copley Square and Harvard Square where three or more modal facilities exist but generally lack effective integration to allow or even encourage transfer or multi-modal trips.

- standardization of equipment:

The absence of uniform use, location and type of traffic control between communities within the demonstration area often results in confusion, inequity and disregard of traffic rules and regulations within these communities. The consequent congestion, capacity restraints and safety hazards significantly reduces the level of service on the major and minor arterials within the core and region. In consonance with the institutional traffic policy program it is proposed to reinforce the demands for uniformity through increased standardization of equipment and enforcement. Existing Federal and State aid programs (eg. TOPICS, Urban Systems) would be closely coordinated with this integrated program.

- shared spare parts pool:

It is proposed to establish a formal traffic control equipment spare parts inventory among the communities of the demonstration area. Informal arrange-

ments already exist among some communities. The ability to quickly replace broken or antiquated equipment and, therefore, maintain the integrity of the system would result. The potential for volume purchasing (signs, signal heads, lenses, detectors, mast arms and posts etc) could realize significant savings for all communities participating.

- shared maintenance facilities:

The uniformity of traffic control and the sharing of parts inventory will enable the establishment of common maintenance facilities and manpower arrangements. This facility and its staffing would allow a high-level of traffic control sophistication on a systems wide scale within the regional core area. Traffic control equipment, maintenance and expertise weigh heavily upon these communities, resulting in discrepancies in their ability to maintain and effectively operate the equipment. Limited fiscal resources greatly affect this situation. The economies of scale resulting from this effort would be significantly beneficial to the communities, in terms of cost savings and to the operational integrity of the regional traffic management program within the Boston region.

- pedestrian environments utilizing existant and proposed facilites:

Many areas of the city contain subterranean pedestrian walkways which are underutilized at certain times of day, or actually in disuse. This item proposes that we carry out an implementation program to better use these walkways.

The benefits of underground walkways would be great; the costs minimal.

Principal achievements would include:

- relief of crowded sidewalks
- lessening of pedestrian/vehicle conflict
- reduction of MBTA transfers for one stop rides
- increased space for retailing

- climate-controlled environment
- possible increases in use of the MBTA

Some pedestrian tunnels do not make useful connections; others only do so at present if one passes through turnstiles, for a cost of 25¢. The object of the program would be to enable non-MBTA users to walk through convenient station networks without paying. This would require more turnstiles, the introduction of transfer tickets and the relocation of turnstile barriers. Alternatively, it would require free passes or a free zone to all-corners on the Downtown MBTA, which could be financed in a variety of ways. In either case, the program would require better graphics and decor.

The proposal would involve a series of discontinuous walkways, using tunnels already in existence. Eventually, the necessary connections would be introduced to make a continuous underground system.

Initial connections are as follows:

State Street - from One Washington Mall to the Old Corner Bookstore and the Post Office (3 blocks)

Washington Street - North and South on Washington Street from Franklin Street to Bedford Street (3 blocks)

Park Street - from Washington Street to Temple Place (1 block)

Arlington Street - from Arlington Street to Berkely Street at Boylston Street (1 block)

Copley Square - from both sides of Copley Station to the Back Bay Station* (2 blocks)

Haymarket - from parking lot to Government Center garage (1 block)

Charles Street - connection to Bowdoin (1 major block)

Essex Street - from new station to old station (outbound) and also to Boylston Station (2 and 1 blocks)

Government Center - to State Street subway (would involve construction)

- to North End halfway to Aquarium Station (would involve construction)
- to Bowdoin Street (would involve construction)
- to Park Street (would involve construction)

Charlestown - link parking to Community College

Other links are also feasible; this list is not intended to be exhaustive.

The design, cost and feasibility of both a short - run and a long - run program in combination with possible second-level connections would also be examined.

- Establish and/or coordinate a Pedestrian System within the core area:

The proposed effort would establish the following pedestrian environment according to the specific areas of concern, as follows:

- Continuity of Pedestrian System:

- Connection of green areas would not have to take the form of definite linear links (although that is an alternative) but could be various elements which would lead one visually from green area to green area.
- Identification of and/or enhancement of sight lines
- Connect broken pedestrian routes:
 - a) Continuity of sidewalks in good condition.
 - b) Acquirement of easements through private property and existing development.
 - c) Establishment of proposed routes through/around/over/under new development.

- Pedestrian and Architecture:

- Identification and application of specific architectural amenities, such as arcades, which could be plugged into the pedestrian infrastructure.

- Sensitivity towards the architectural character of specific sub-areas which could become predominately pedestrian environments (such as the Batterymarch area). The architectural character could become the predominate pedestrian experience.
- Reintroduction of historic squares could serve as basic components of a pedestrian system, such as Scollay Square, Winthrop Square, etc. This could also lead to the creation of new squares.
- Explore the potential of pedestrian paths cutting internally through retail and office buildings.
- Pedestrian and Visual Experience:
 - Elimination of the visual blight and the negative nature of particular pedestrian paths, particularly narrow alleys, such as from Government Center to State Street; Winthrop Square to Arch Street.
 - Identification of significant sight lines to be created or preserved.
 - Graphic exaggeration of preferred pedestrian flows or the existence of pedestrian amenities.
- Pedestrian and Transit:
 - Clear identification of pedestrian transit systems and the co-ordination of their interface with other modes.
 - MBTA Stations, through face-lift and/or redesign, could provide dynamic points of entrance to CBD. They could also become key urban elements in pedestrian system.
 - Mini-bus route-stops could either take the entire curb line of their respective routes, providing continuous linear accessibility, or become clearly defined, specific points of access.

- Pedestrian System and Design Consciousness:

- Elimination of confining spaces along sidewalks
- Open, green areas which are currently inaccessible or nearly so, such as Granary Burial Grounds.
- Avoid creating and attempt to correct windswept areas which dominate certain areas of the pedestrian experience. (eg. Government Center Plaza)
- Introduction of design elements which would allow the inclusion of more green surface (GRASS) instead of expansive paved areas.
- Introduction of calm zones/areas along pedestrian routes which would allow for stopping, resting, greeting, talking, eating.

- Identification of specific areas/streets, where noise is a dominant factor:

Brainstorm on ways of either eliminating the source or adding elements which would absorb the noise.

- Lighting:

- Public and historic buildings.
- Private, architecturally interesting buildings.
- Recognition of the vernacular of gaudiness, such as the combat zone, Bond's, etc.
- Emphasizing the environment, not just lighting the footpath.

Light can go up, too.

- Imaginative thinking would ease the environmental blight of specific elements which cannot be phased out or replaced; such as the central artery.

- Sensitivity to the handicapped:

Recognize the need to design in elements which would ease their journey.

- Portable Park:

- Analysis of the role such an element can play within the pedestrian superstructure.

- Introduction of informational kiosk type elements aimed at aiding and possibly entertaining the pedestrian (eg. city signs and lights kiosk).

- Pedestrian and Research:

Identification of factors which will need research data to support or disapprove initial design concepts (eg. Batterymarch area - will it support an in-town neighborhood that will provide the impetus for the pedestrian environment.

